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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,072	07/15/2003	Chee Wei Wong	MIT.9923	7118

7590 09/13/2004  
Samuels, Gauthier & Stevens LLP  
Suite 3300  
225 Franklin Street  
Boston, MA 02110

EXAMINER
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KANG, JULIANA K

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 09/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/620,072

Applicant(s)

WONG ET AL.

Examiner

Juliana K. Kang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2/9/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Inventorship***

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

### ***Drawings***

2. The drawings are objected to because Figures 1-3 are not legible. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the

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remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. Applicant's assistance is requested to correct any errors that may be noticed in the application.

### ***Claim Objections***

4. Claims 19-22 are objected to because of the following informalities: Claims 19-22 recites "the method of claim" in the beginning of each claim. It appears that claims have incorrect dependencies. Because the method claims 12-18 are exactly parallel to the preceding apparatus claims, the Examiner will interpret the claims 19, 20 and 22 as dependent claims of claim 18 and claim 21 as dependent claim of claim 20 for the examination purpose. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

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6. Claims 1, 3-5, 7, 9-12, 14-16, 18, and 20-22 are rejected under 35 U.S.C. 102(a) as being anticipated by Matsuura et al (WO 02/10843 A2).

Matsuura et al disclose a photonic bandgap microcavity comprising a membrane structure (support) that can experience strain (see page 7 lines 2-9); and a photonic bandgap waveguide element formed on said membrane structure having a defect so that when said membrane structure is strained, said photonic bandgap waveguide element is tuned to a selective amount (see page 2 lines 27-30, page 6 lines 16-22, page 7 lines 22-25 and page 9 lines 20-24). Matsuura et al further disclose that the invention is applied to 1-dimensional, 2-dimensional and 3-dimensional photonic crystals (see page 8 lines 26-30). Matsuura et al further disclose using a bottom electrode and a top electrode to deform the membrane structure to tune the photonic bandgap waveguide using micro-actuators including a piezoelectric actuator (see page 13 lines 27-30, page 15 lines 22-33 and page 19 lines 1-9 and line 15-17).

Please note, regarding the method claims above, that method claims parallel article claims exactly without the introduction of any particular manufacturing methods, so that it is proper to examiner the article and method claims together.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuura et al and further in view of Caracci et al (U.S. Patent 6,445,838 B1).

Matsuura et al disclose using silicon-based substrates that can be physically deformed due to piezoelectric response but does not explicitly teach SiO<sub>2</sub> layer. Silica is well known material used in the art and furthermore Caracci et al that silica is expandable in response to the stimulus of heat or a piezoelectric material which is expandable in response to the stimulus of voltage. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use silicon based substrate such as SiO<sub>2</sub> in Matsuura et al as taught by Caracci et al to tune the waveguide element.

9. Claims 6, 8, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuura et al.

Regarding claims 6, 8, 17 and 19, as described above Matsuura et al disclose the claimed invention except the claimed strain approximately 1% or strain on the membrane between 0.2 and 0.3%. Matsuura et al tuning of photonic crystal by stressing the membrane permits precise control of light traveling through the photonic bandgap waveguide (see page 3 lines 24-27, page 6 lines 1-8, and page 8 lines 26-30). Since Matsuura et al provide the same claimed structure and also teaches tuning of the photonic crystal precisely, it would have been obvious to one having ordinary skill in the art at the time the invention was made to tune the device with any desired tuning including the claimed tuning of approximately 1% or to introduce strain on the

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membrane between 0.2% and 0.3%, since it has been held that discovering an optimum value of a result effective variable and discovering the optimum or workable ranges involves only routine skill in the art.

Please note, regarding the method claims above, that method claims parallel article claims exactly without the introduction of any particular manufacturing methods, so that it is proper to examine the article and method claims together.

### ***Conclusion***


10. The prior art documents submitted by applicant have been considered and made of record (note the attached copy of form PTO-1449).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juliana K. Kang whose telephone number is (571) 272-2348. The examiner can normally be reached on Mon. & Fri. 10:00-6:00 and Tue. & Thur. 10:00-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rod Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Juliana Kang  
September 9, 2004